



Australian Government
Australian Greenhouse Office

Car sharing: An Overview

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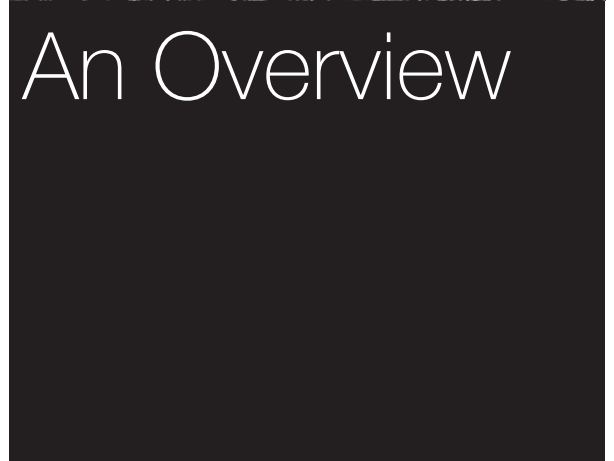
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Summary

The primacy of car-based mobility has become a widespread problem in most cities in the world. In Australia, the situation is no different, as the car has an even more dominant role than in European cities.⁶ In Australia, transport is the fastest growing sector contributing to greenhouse gas emissions. Emissions from transport are second in magnitude only to the stationary energy sector.⁷ Enormous amounts of land and capital are bound up with cars, roads and parking space. This is a result of high levels of private car ownership. Although in medium and high-density urban areas many people walk, cycle and use public transport, there are occasions when they still see a need for some car travel. This is the 'mobility gap' that car sharing seeks to fill.

This report describes the concept of car sharing. Its purpose is to identify car sharing organisations in other countries and to examine the preconditions required to establish and run a car sharing organisation (CSO) in order to examine Australian conditions as a basis on which to encourage local initiatives. At an anecdotal level, car sharing is known to exist in a number of Australian cities. For example, approval was granted to a high-rise residential development to operate a car sharing scheme through a local car provider as a substitute for not providing on-site car parking. Other Australian CSOs are small-scale and none is known to be linked formally to public transport providers⁸.

Car sharing is one of a number of mobility strategies,⁹ which solves some car ownership problems and problems associated with high car-reliance. A brief history of the concept of car sharing and its relationship to other mobility management concepts is outlined in Section 2. Some well-developed and/or innovative car sharing organisations overseas are described in Section 3. The benefits

both to individuals and to the community are discussed in Section 4. The final section outlines the key situational requirements and institutional arrangements that support successful car sharing organisations, both commercial and not-for-profit.

Most car sharing organisations (CSOs) start as small, local, not-for-profit operations supported by public funds and largely run by people with a commitment to enabling their clients to reduce car use and avoid the high fixed costs of private cars. The transition into economically viable businesses has been difficult for most of the CSOs that have chosen to operate commercially. This report explores the approaches, infrastructure elements and mechanisms that are the components of a CSO, drawing on examples in Italy, the UK, Austria, the USA, Canada, Switzerland and Asia.

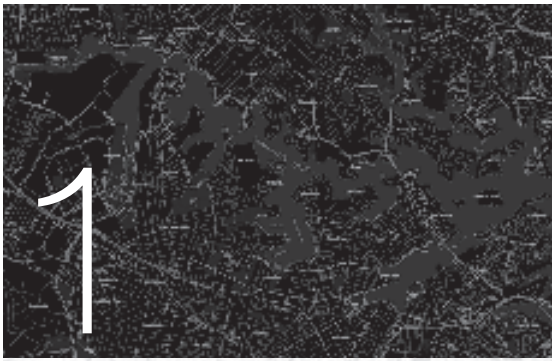
We conclude that the success of a CSO depends on the type of CSO established, its locations and clients, the broad range of participants involved (including partner organisations), its relationship to and the accessibility of public transport networks, and what we have called CSO infrastructure, which includes levels of service, fleet quality and mix, appropriate technology and capacity to manage variable growth. Measuring success depends on organisational goals, which may not necessarily be commercial. Given that there is no agreed methodology to evaluate CSOs, this report does not offer a definitive formula for success.

⁶ Newman, P. and Kenworthy, J. (1999) *Overcoming Automobile Dependence*, Island Press, Washington

⁷ Australian Government (2003) *Transport Sector, Greenhouse Gas Emissions Projections*, Interdepartmental Greenhouse Projects Group, p12. Available online at: <http://www.greenhouse.gov.au/projections> (see *Transport Sector*) Essentially, stationary energy is any energy used in fixed locations such as buildings or industry. See also CSIRO *Transport & Energy Sector Outlook 2020* Report.

⁸ UITP CD Rom, (CD 03/01B), *Public Transport and Car-Sharing: Together for the better*, See UITP Website, <http://www.uitp.com> (see *Publications, Complete list of publications*)

⁹ Other such strategies include for example, economic measures such as road charging, improved public transport services and the provision of location-specific travel information.



THE CONCEPT

1.1 THE CAR SHARING CONCEPT

1.1.1 Context

People and organisations around the world are working to better manage the mix of travel modes they use to access the services and locations they need to participate in social and economic exchanges. Sustainable transport facilitates the use of an integrated and sustainable mode mix, to replace some private car travel. Sustainable modes include walking and cycling (non-motorised modes) and taxis and mass transport (public transport) systems. The transition to greater use of these more sustainable modes can be supported in a number of ways and the combination of approaches is sometimes called mobility management (MM), or mode share management (MSM). Neither term is clearly defined but generally, each seeks to reduce reliance on travel by private cars by making a diverse array of public and private transport modes accessible by and affordable for urban populations; reducing congestion and increasing amenity in urban areas. Car sharing is a strategy that seeks to meet the mobility gap between public transport and private motor vehicle travel.

The concept of car sharing is multi-layered. In the primary layer, individuals gain the benefits of private cars without the costs and responsibilities of ownership. Specifically, car sharing allows a member (such as a household or business) to access a fleet of shared cars and other types of motor vehicles as needed, paying a usage fee each time. This removes high fixed costs such as registration and third-party insurance, as most costs become both variable and lower. Vehicles are available to members more

or less as required for any length of time (from one hour, up to several weeks or more) and at many points (dozens of locations in a city or even in other cities). So, instead of buying a car, people and/or companies, share a fleet of vehicles with usage costs dependent on the kilometres travelled and the period of time for which the vehicle is booked.

In the second layer, car sharing helps the community reduce the number of trips and distances travelled by private cars. In the third layer, urban communities gain space for productive uses when space currently occupied by roads and parking is not expanded and communities also experience less air and noise pollution.

A fourth layer is the involvement of motor vehicle manufacturers and those who maintain vehicles, who play a vital role in many successful car sharing organisations. The manufacturers benefit by being able to demonstrate innovative fuel-efficient vehicles.

1.1.2 Defining Car Sharing

The characteristics of a typical car sharing organisation include a provider with a centralised system for bookings, data collection and billing; clients who are members of the organisation; infrastructure made up of a fleet of vehicles and parking spaces at key locations within the geographic catchment area; and formal relationships with government, public transport providers and car manufacturers.

This structure is illustrated in Figure 1.

Typically, CSOs make vehicles available at a wide variety of locations for very short periods of time (1 hour minimum and upwards) and they are accessible all the time (24 hours a day, 7 days a week). Payment reflects the use of the vehicle in terms of both the total time the vehicle is booked and the distance travelled. Therefore, the CSO customer pays a variable price for driving the vehicle and avoids the fixed costs of owning the vehicle. In this respect, paying for the use of the vehicle is similar to paying for a public transport trip.

Other service level factors to consider are the punctuality and efficiency of service and the friendliness and helpfulness of administrative staff. Booking service standards should be those generally expected from professional call centres, including friendly, competent service and low waiting times. This implies highly trained staff and good information tools (making bookings, knowing the product, capacity to handle complaints etc).

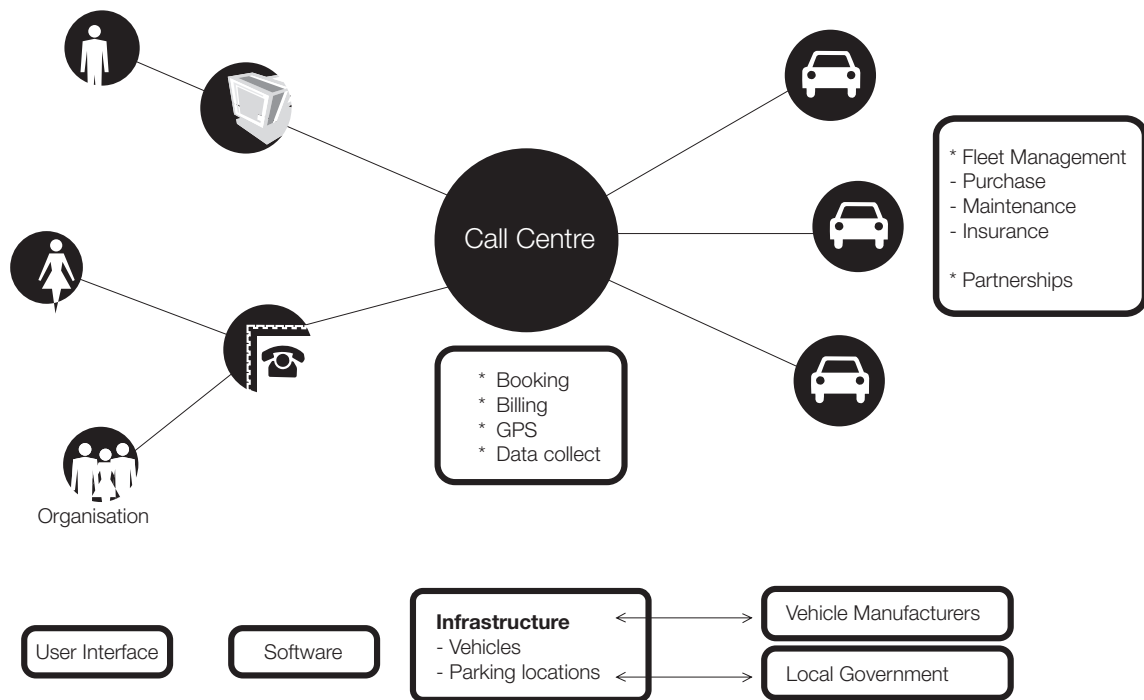


Figure 1: Elements of a Car Sharing Organisation

Technology

Administrative aspects can be enhanced using information technologies (IT). Manually operated systems can be less reliable the bigger the fleet gets, with mistakes in reservations, access and billing. Without real-time monitoring it is hard to manage a fleet effectively. There is also vulnerability to vandalism and theft. Computer technologies, the Internet, mobile phones and smart cards have enabled on-line booking, on-board computers, access with smart cards, wireless reporting and monitoring and automated billing. For any new car sharing organisation, this requires a bigger investment in IT but there are numerous advantages.

In order to react quickly to market changes (membership, average car use), cars should be monitored closely. Car sharing fleets without an IT system that facilitates this, need to develop very good reporting systems, as these are crucial to maintaining quality and service and reacting to changes in the market. Key measurements are:

- kilometres per car
- kilometres per member
- members per car
- car availability per location, or location cluster.

Car sharing is more accurately called vehicle sharing, since fleets often consist of different vehicle types to accommodate clients' varying requirements and

preferences. Fleets might include, hybrid vehicles (e.g. petrol-electric or pedal powered vehicles with electric assistance capability), motorbikes, small trucks, station wagons, four-wheel drives and luxury vehicles, so that members can select the most appropriate vehicle for a specific task at the time the vehicle is needed.

Each of infrastructure (the vehicle fleet and parking spaces for storing vehicles), appropriate booking technology, capacity to manage variable growth and services levels and relationships (including with public transport providers, local government and businesses) contribute to successful CSOs.

1.1.3 Objectives of CSOs

Car sharing organisations are established for a range of reasons and their objectives understandably vary. Not all CSOs seek to make a profit and instead many function in the not-for-profit or social profit sector. The objectives of a CSO affect the way in which it is managed and how it measures success. For example, a CSO with goals based on reducing the environmental impact of cars in a city is likely to incorporate into its fleet low or zero emission vehicles (electric, gas and hybrid motor vehicles, electric bicycles and tricycles) and to form partnerships with vehicle suppliers.

1.2 Essential relationships

Increasing international experience with CSOs indicates that some participants are vital to ensure car sharing is a success. Most successful CSOs have established relationships with local government and/or with motor vehicle manufacturers. Both have a unique contribution to make to the success of car sharing.

1.2.1 Local government

Local government generally controls the spaces in which CSOs operate. Specifically, local government controls the availability and prioritising of parking spaces, which is one of a CSO's vital infrastructure needs. Local government can prioritise desirable parking spaces for more sustainable vehicles, including car share vehicles and smaller, more efficient vehicles. The contribution of local government thus extends beyond making storage parking available for CSO vehicles, to making prioritised parking available in sought-after locations (for example at retail and recreational centres).

1.2.2 Manufacturers, vehicle suppliers and maintenance organisations

Motor vehicle manufacturers have control over a different CSO infrastructure requirement—the vehicles. The business relationship between a CSO and a vehicle manufacturer can be mutually beneficial. A manufacturer can lease vehicles to a CSO (and thereby reduce the maintenance and fleet management responsibility and costs for the CSO), whilst the manufacturer receives the dual benefits of both demonstrating and familiarising clients with the new vehicles they use and more broadly promoting those vehicles as they are driven by car sharing clients.

This kind of arrangement already exists in Switzerland where purchasers of a Mercedes-Benz Smart¹⁰, can now also purchase a mobility package (to the value of A\$400) for just A\$50 per year. The package includes a subscription pass allowing the pass holder to purchase all train and bus tickets for half price throughout the year and access to all car share vehicles—with no membership fees—at a slightly higher hourly rate and the same mileage rate paid by other clients of Mobility Car Sharing Switzerland (Mobility®).

1.3 Types of CSOs

In addition to the essential relationships connected to the basic infrastructure needs of a CSO (described in 1.1.2), increasingly CSOs have grown in association with either public transport operators or as part of urban housing developments. Combinations of these relationships (as well as the essential relationships) also exist (see the European MOSES project, page 43 this document).

1.3.1 Public transport interoperability

Car sharing organisations can be specifically designed to enhance sustainable modes of transport, by filling a 'mobility gap'. Modes such as walking, cycling and public transport are complemented by access to a car on an as-needs basis without the high cost of ownership. A CSO with this focus will closely integrate its service with existing public transport. Regular users of public transport and holders of periodical tickets can be offered try-outs and discounts. In the city of Bremen in Germany, the public transport operator provides a smart card (Bremer Karte PLUS) that pays for public transport use, is an access card for car sharing and can be credited with money to pay for other goods and services.

Easy use of the public transport services within a city is not the only important element. Contractual arrangements between CSOs operating in different cities have been used to ensure that CSO members can access cars in their place of usual residence and when travelling to other cities. This approach is being pursued in Italy (See Section 3.1) and is important in increasing the use of long-distance public transport.

¹⁰ A small two-seater combustion engine vehicle (recently introduced in the Australian market)

1.3.2 Urban housing developments

Sustainable housing means looking beyond bricks and mortar and seeking to integrate mobility services.¹¹ Urban policy (for example planning controls and land use zoning) can effect multiple layers of change when used to reduce the need for private motor vehicle ownership and parking spaces. Such changes to urban design have been supported by or used to support a CSO¹² and eleven car-free housing projects of this kind have been completed in Europe.¹³ Residents of these developments usually sign an agreement not to buy cars.

In some cases, local government (or other regulatory bodies) has approved reduced parking space provision because car sharing has been provided to residents of a development. This reduces the cost of housing developments. Developers have responded to this in a variety of ways, including providing more affordable housing, adding extra housing units or developing additional services in the communal space. The space available can be significant, for example in Bremen the 180 parking spaces nominally required for 210 units were replaced by just 30 spaces.

In Edinburgh¹⁴ in the UK for example, a new housing development with over 110 units was built with only eight parking spaces on the basis that residents would be members of the car sharing organisation. Combining transport and housing allowed the re-allocation of space which would have been designated for parking, to more productive uses within the housing development, leading to better quality housing as well as reduced impacts on the local and wider community. Reduced parking requirements allow higher densities to be achieved and create the potential to develop sites previously regarded as difficult.¹⁵

When heritage listing constrained the development of a former hospital site in Hamburg, a development competition to adaptively re-use the site was conducted. The small site and its heritage character

limited car parking provision. The winning company's focus on mobility management was an aspect of the innovative design. In collaboration with Volkswagen, the developers were able to make five vehicles and associated booking facilities available to residents to establish a small CSO. Public transport passes were also provided and communal bicycles made available for rent.

In the GWL-terrein project in Amsterdam, cycling is the main travel mode for most residents and only about 20% of residents own a car. The CSO has a range of vehicles available for use by members. An environmental bonus is that storm water and run-off on the site is easier to manage. This is because the interconnected system of urban spaces throughout the development has created a significantly lower percentage of impervious surfaces compared with conventional developments.

In Freiburg, Germany¹⁶ the CSO worked with both a housing developer and the national railways to provide an attractive package to its members. Residential parking was strictly limited, with no parking provision allowed on housing sites. Residents instead purchased space in the area's communal garage. Car sharing vehicles are garaged there and the CSO membership package includes an annual public transport pass for the whole region and an annual subscription for nationwide, half-price train travel.

The connection to housing is also recognised in the USA. For the first time, in 2003 a similar concept has been marketed in North America. A 24-storey condominium tower project in Vancouver, Canada, is offering car sharing as a low cost alternative to parking space.¹⁷ The developer, Wall Financial, will give the corporate body seven cars, including four hybrids. A local non-profit group, Cooperative Auto Network, will manage the CSO. In San Francisco, most affordable housing projects surveyed¹⁸ have under-used off-street parking. To address this, City CarShare is working with developers to include parking space for car sharing vehicles.

¹¹ Taylor, J. The Heineken effect: car clubs and sustainable housing p3. <http://www.carclubs.org.uk> (see *Car clubs, City centre living/low car housing*)

¹² Most of these examples are described by Jan Sheurer in work for a PhD thesis available online at <http://www.wistp.murdoch.edu.au/> (see *Recent Publication, Carfree housing in Europe*)

¹³ Network <http://www.wohnen-plus-mobilitaet.nrw.de>

¹⁴ Hazel, G. 1999 Sustainable Transport Solutions in Edinburgh, *Transport Engineering in Australia*, 5:2, p86–90 and *Transport, Sustainability and Engineering, Transport Engineering in Australia*, 5:2, p83–85

¹⁵ <http://www.carclubs.org.uk> (see *Car Clubs, City centre living/Low car housing*)

¹⁶ The development location is Vauban.

¹⁷ *Electric Avenue Condominiums*, a project developed by Wall Financial Corporation. See http://homes.wsj.com/columnists_com (see *Bricks and Mortar, New Vancouver Condo's come with Car Sharing*)

¹⁸ Cited in *Rethinking Residential Parking-Myths and Facts, (2001) Non-Profit Housing Association of Northern California (NPH)*.



1.3.3 Risk

The risks for operators of a CSO vary according to the objectives of their chosen delivery model. Small operators need to ensure they have low overheads and efficient management and administration for bookings and motor vehicle maintenance.

In particular, small operators need to manage growth in membership and acquisition of new vehicles.

Larger organisations need to consider the insurance implications of their operation; being similar to car rental companies in terms of risk profiles they may need to seek ways to reduce this overhead to keep members' costs low.

1.4 Location

The places where car sharing is first established need to be carefully chosen so that the CSO responds to and fits its location. Land use, population density and availability of public transport are key considerations.

Two critical considerations for a CSO are the kinds of activities occurring in the location and the travel patterns of people there. CSOs are most successful where there is sufficient economic and social activity in the selected location and where that activity has a strong relationship to public transport. Rather than occupying a single location, large-scale CSOs

have a number of parking spaces reserved for their vehicles throughout a city. These spaces are a key component of the CSO's infrastructure (described in Section 1.1.2). In some cases the CSO's spaces are complemented by prioritised parking spaces in public car parking facilities (See Section 1.2.1).

Car sharing is ideal for people who do not need a car every day. Therefore CSOs must provide a service that is convenient for people who usually walk, cycle or use public transport. People who use a CSO will meet some of their access needs using a car from the CSO's vehicle fleet. The ability of a CSO to meet people's mobility needs depends on the links between its services and other transport modes the customer uses. Good integration with public transport for example, makes it easier for people to use both public transport and cars owned by a CSO for their different trips. Being able to get to the pick up location within a very short time and being able to drop off the car close to the customer's destination are also critical. The need for integration includes the need to easily transfer luggage between services because luggage is a reason people who often use public transport choose to use a private car or a taxi.



1.5 Potential client groups

The initial establishment phase of a CSO is crucial. There should be an adequate potential number of members around the first car sharing locations. One approach¹⁹ has been to focus on the immediate surroundings of a car sharing location (within a radius of about 500 metres). Car sharing customers tend to be well educated with middle-level incomes. Analysis of urban areas should identify favourable strategic areas in a city to start car sharing.

Car sharing is especially suitable for large and compact cities (agglomerations of 300,000 or more). It has been successful in cities like Amsterdam, Zürich, Berlin, Vienna, Montreal and Seattle. In cities with fewer inhabitants, it tends to be difficult to build up a dense network. One study²⁰ has shown that well over ten per cent of the population of large, compact cities are potential car sharing customers.²¹

Car sharing organisations have two main client groups. Firstly, individuals with low car-mobility needs, that is, people who do not have to make car trips every day and who typically drive less than 10–15,000 km/year. They live in cities and have good access to quality public transport or can go to work on foot or by bicycle within the geographic catchment of the CSO. The second client group is organisations (for example, private companies, hospitals and councils), with a need for travel to and from their business location, especially those that have a vehicle fleet with a low annual mileage. Early car sharing organisations tended not to recognise or cater for this group, but businesses are now an important client group for most of the bigger car sharing organisations. Car sharing organisations offer the business sector outsourced motor vehicle transportation, in effect managing a fleet of vehicles available to employees or agents of the business and helping to reduce the inefficient use of a vehicle fleet when organisational demand fluctuates. As specialists, car sharing organisations tend to manage fleets more effectively than a company with a different core business. Employees can also

usually book their car mobility through the CSO for business trips in other cities. If a company also encourages employees to travel to work by bicycle or public transport, car sharing provides for instances where employees need a car (for example, when working late). In transport demand management²² terms, business car sharing provides a 'guaranteed employee ride home' scheme.

In Switzerland, more than 800 companies, administrative bodies and associations contract with a CSO and drive Mobility[®] motor vehicles, saving on purchase, insurance, repair and maintenance costs.²³ In Bremen, the city administration (local government) is replacing any vehicles in its fleet with less than 10,000 km annual mileage, with staff access to car sharing.²⁴ At the time of writing, sixty members of staff had been given a smart card and PIN code to use the service and a new car sharing station near the head office will have three cars reserved for their use during office hours. Other vehicles will be available for booking as required.

If a large proportion of these two groups can be convinced to use car sharing instead of buying a car, this could have significant impacts on vehicular traffic and parking problems in cities or specific localities within large cities (see Section 4).

The advantage for a CSO in focussing on both groups is that workplaces, hotels and major trip generators such as universities have seasonal demand patterns for cars. By serving both types of client, the CSO can maximise the use of the vehicle fleet they own.

¹⁹ For example Herry/Rosinak: Die Akzeptanz von Car sharing in der näheren Wohnumgebung, Vienna 2000

²⁰ Peter Muheim & Partner: Synthese zu: Car sharing - der Schlüssel zur kombinierten Mobilität, Bern, September 1998. See also <http://www.mobility.ch>

²¹ Numbers vary widely, as most people do not know or only have a very rough idea, what car sharing is. Therefore, survey results are reliant on the depth of information provided on car sharing by researchers.

²² TDM – Transport Demand Management (in Europe called Mobility Management). See also <http://www.epomm.org>

²³ If a business customer uses Mobility[®] cars on a regular basis, Mobility[®] will station its vehicles at the customer's headquarters or outlets.

²⁴ <http://213.170.188.3/moses> (see latest news)



1.6 Related concepts

Concepts similar to car sharing have operated overseas with varying degrees of success.

1.6.1 Car pooling

Car sharing should not be confused with car pooling, which is more accurately termed 'ride-sharing'. In car pooling, owners of cars provide rides to other passengers in a more or less organised way, on a regular or irregular basis. It requires mutual agreement and trust and is generally not suitable for organising as a for-profit business.²⁵

1.6.2 Rental cars

Rental cars are provided in a limited number of locations (maximum of a few per city) and their cost basis is mainly time. They have a longer minimum rental time (normally a day) and access is not always 24 hours a day, 7 days a week (in Europe, it is often limited to regular office hours). Fuel is normally not included in the price. This pricing model contrasts with car sharing, which seeks to shift the costs of motor vehicle use to being increasingly variable with use (rather than fixed or upfront). Thus, CSOs usually have very small increments of time (such as 1 hour) as the basis of their billing, compared with the rental approach of per day charges.

However, because usage patterns for rental cars are different to car sharing usage, some car rental firms have entered the car share market. The primary usage of rental cars both in Europe and Australia is weekday business-related use. Rental vehicles are used less on weekends and are therefore available for car sharing. There is also a seasonal (tourism related) usage pattern. Rental cars are often used to travel longer distances and for a longer period.

1.6.3 The station car

The station car system was developed for people who need a car for part of their journey to work. While the car is idle at a public transport station, other people can use it. This concept was mainly used in the 1990s in the USA and often employed electric motor vehicles. The national station car association²⁶ was founded in 1992 and there were station car locations in over fifteen cities. However, it has never developed into a commercial success or realised the growth rates of CSOs. Owing to insurance rate increases since September 11, a large number of station car projects have failed.

1.6.4 CashCar

Developed by the founders of StattAuto in Germany, the CashCar allows car owners who do not need their cars all the time to rent it to a car sharing organisation. In 2002, this idea was developed into a new company called rentmycar.²⁷ Given the relative infancy of this organisation, it is too early to know if the model is sustainable.



²⁵ The exception is long-distance-ridesharing, which works in some countries in a limited way; for example the Mitfahrzentrale in Hamburg (<http://www.mitfahr2000.de>) or Allo Stop in Quebec (<http://www.allostop.com/english>)

²⁶ <http://www.stncar.com>

²⁷ <http://www.rentmycar.de>



HISTORY OF CAR SHARING

2.1.1 Car sharing in the context of sustainability

Car sharing is one of a number of measures assisting communities to move toward more sustainable urban transport systems. Changing global pressures and a focus on environmental sustainability are key motivators in the development of these approaches. In each of the last three decades, a wave of activity around car sharing has moved the concept and its practice further. In the early 1970s two key events added momentum toward car sharing: the UN Conference on the Human Environment in Stockholm in 1972 (where the impacts of development were first discussed in the global arena²⁸) and the oil crisis in 1973–74, (now called ‘the first oil shock’). In parallel, car sharing was established in a few European countries, at least partly in response to the global oil crisis²⁹ but aided by high car costs and low car ownership levels.

The sustainability debate continued, with one turning point in 1987 when the Brundtland Report (Our Common Future) was published, arising from the UN’s World Commission on Environment and Development (UNCED), and another at the 1992 Earth Summit in Rio de Janeiro. In Germany,

Switzerland, the Netherlands and Austria during this period, car sharing grew to be a noticeable part of the mobility services available in some cities. It is now proliferating in many other countries, including other European Union countries, and in Canadian, US and Asian cities. The major periods of growth have been in the 1990s, consistent with a renewed focus on sustainable transport policies and the related concept of Ecologically Sustainable Development. It is worth noting that technological changes such as digital communications and increasing computer portability are also likely to have contributed to this growth.

2.1.2 Commercial pioneers in Europe

The first commercially successful car sharing organisations began in Switzerland (1987) and Germany (1988). Two grassroots CSOs in Switzerland achieved growth of 50% per year and quickly moved through several stages of organisational structure, service quality and technology. In 1997, they merged to form a for-profit business ‘Mobility Car Sharing Switzerland’, (Mobility[®]) with a combined membership of over 11,000 and a fleet of 600 motor vehicles. Today, Mobility[®] is the biggest car sharing organisation in the world, with over 50,000³⁰ members and a fleet of 1750 motor vehicles operating in more than 400 towns and cities across Switzerland.

In conjunction with the Swiss Federal Railways (SBB) and Zurich Public Transport (Zurich Verkehrsverbund, ZVV), Mobility[®] packaged a half price annual season ticket for all public transport and reduced rates for Mobility[®] car share. Eight hundred Mobility[®] vehicles are available within 200m of the station exit/entrance of 350 train stations across Switzerland.

In Germany, StattAuto (sic) was founded in 1988 in what was then West Berlin. In 1998, two companies, Berlin StattAuto Car Sharing GmbH and Hamburg StattAuto Car Sharing GmbH merged to form StattAuto Car Sharing Aktiengesellschaft; the first

²⁸ The context of more sustainable development was discussed internationally for the first time at this event, although debate focussed on slowing development to protect the environment and human health. In response, developing countries sought a more complex concept to consider their quite different position in the cycle of development.

²⁹ There were some earlier experiments that never achieved commercial success. The Witkar in Amsterdam (1973) is the most famous.

³⁰ Mobility Car Sharing, Annual Report 2002 – in August 2003 membership was at 55,000 – or 1.5% of all holders of drivers’ licences in Switzerland



stock exchange listed car sharing company, with a presence in five German cities.

The main difference between Germany and Switzerland is that in Germany, many independent car sharing organisations were founded, leading to more than 50 countrywide. However, links are now being formed between them. German Railways (Deutsche Bundesbahnen, DB) has moved into the arena of mobility management, starting its own car sharing organisation and making agreements with other CSOs, including the market leader StattAuto. DB Car Sharing now offers over 1000 motor vehicles at 500 different locations in 50 cities.

In the early 1990s, Austria and the Netherlands followed the success of Switzerland and Germany on a smaller scale and car sharing has since spread to Italy, Belgium, Great Britain, Scandinavia and Spain (see Section 3 for some examples).

A pan-European organisation, European Car Sharing, (ECS), began in 1991, enabling car sharing across the continent and establishing common standards. ECS provides some assistance to new car sharing organisations. It is dominated by the big German and Swiss organisations and as a founding member, Mobility® handles reservations and bookings at the head office for vehicle use in over 80 European cities. ECS membership has grown 50–60% annually. Today, ECS has 40 participant organisations, which operate shared motor vehicles for about 56,000 members in over 550 towns.³¹

2.1.3 Car sharing in North America

Canada was the first North American country to begin car sharing. Well-organised independent car sharing organisations exist in major Canadian cities and more than 8,000 Canadians use shared motor vehicles.³² Communauto has shared motor vehicles available in Quebec City and Montreal. AutoShare in Toronto has operated since 1998 and now has over 1,000 people sharing motor vehicles. Vancouver's Cooperative Auto Network (CAN) is a not-for-profit cooperative venture with 77 vehicles. It is currently launching a pilot project (TransLink) in conjunction with the Greater Vancouver Transportation Authority. VrtuCAR in Ottawa celebrated its third anniversary of operation in June 2003.

The USA followed Canada in 1998 with its first car sharing organisation in Portland, Oregon. There are several independent car sharing organisations in the USA and two are considering offering services nationwide. Flexcar (founded in 2000), presently operates in five States and over ten cities (see Section 3).

2.1.4 Car sharing in Asia

Car sharing is growing in Asian countries. An interesting aspect is the connection to residential developments and the role of cooperatives. A key aspect of the launch of a car sharing scheme in Singapore in 1997 was the link to a residential development.³³ Developer contributions³⁴ were part of the initial funding arrangement of the CSO. The original fleet of just four vehicles has been extended to a ratio of one motor vehicle for every 40 residents. A cooperative insurer in Singapore (NTUC Income³⁵) was also involved as part of the piloting of the idea. NTUC Income now offers a car share cooperative as a community service. The partners invested about S\$1.5M to establish the cooperative and now have more than 110 cars available throughout 30 locations.

2.1.5 Growing impact – Switzerland

The most well-established car share organisation today is Mobility® Car Sharing in Switzerland. In Zurich, it has more than 140 locations with over 300 cars and more than 10,000 members (about 2.3% of Zurich's population). The growth rate of Mobility® membership was still around 20% per year (average 1999–2002), but has eased since 2003. Key reasons for its success include changing demographics (including a high proportion of single households in the inner city area), parking constraints in the city and Mobility's® strong links with both long distance and local public transport providers. Its client profile ranges from people with a strong ecological motive to pragmatic people who primarily see car sharing as a cost effective service. The limits of this growth are unclear; estimates run as high as 10% of all households, which for Zurich would mean at least a five-fold increase from present levels.

³¹ ECS website: <http://www.car sharing.org>

³² <http://www.autoshare.com/ca/cl.html>

³³ Specifically the Toh Yi estate.

³⁴ The two developers each agreed to pay \$100,000 toward the initiative.

³⁵ This is the only cooperative insurer of more than sixty insurance companies operating in Singapore. Its objectives include maximising service to members and increasing social well-being through community initiatives. See <http://www.income.com.sg>



EXAMPLES

Although CSOs now operate in Europe, Australia, North America and Asia, it is not possible to examine each operation. This section examines examples of CSOs in Italy, the UK, Austria and the USA. Each has been chosen to illustrate a key concept. The respective illustrations are of the involvement of government and the private sector, the transition from rental car services, the role of a private company with strong motor vehicle management and supply experience and public-private partnerships.

In considering each example it is important to keep the varying objectives of CSOs in mind. Varying objectives mean the measure of success will also vary. Key objectives often include:

- reducing private car use (and ownership)
- reducing emissions (including greenhouse gas) from car-based transport
- addressing parking constraints, particularly for residential developments
- increasing public transport patronage
- making a commercial profit.

3.1 ITALY: NATIONAL FRAMEWORK AND PRIVATE INITIATIVE

At the time of writing, the Italian national car sharing network was active in thirteen cities with 80 vehicles and over 1000 clients. Operators anticipate significant growth in the short term, expecting that in five years more than 4,500 people will use more than 230 shared vehicles. Car sharing in Italy is unique because of the combination of government regulation and private sector operation of the service, developed with the objective of creating an integrated national system. Other standout factors are the technologies employed in the systems and a focus on electric vehicles.

3.1.1 Government involvement in Italian car sharing

From March 1998, the Italian Government became more active in the regulation of mobility, paying added attention to innovative approaches such as mobility management. In this framework, car sharing was seen as part of the overall effort and thereby entitled to government funding. It is notable that in Italy all local operators are directly connected to public transport companies.

The Ministry of the Environment provided €9,296,224 and established the Iniziativa Car Sharing association (ICS), to be responsible for administering and assigning grants. The association's mission is to finance the start-up of car sharing organisations in Italy, according to the quality and operational standards identified by European Car Sharing.

3.1.2 Role of ICS

The centralised approach sought to increase standardisation of services. It allows the interoperability of services in different cities and locations and a minimum quality of service and integrated communication between operators. Local operators maintain responsibility for defining prices and market policy, taking care of vehicles (maintenance and cleaning), planning investments, getting clients and cooperating and integrating with local government and others who provide mobility services.

To the CSO operators, ICS offers the following services:

- technical and legal consultancy
- project support for designing the system and service (which must consider local needs and characteristics)
- communication tools and promotional activities on a national level
- promotional, communication and marketing tools on a local level
- call centre services
- technologies for the management of the fleet and the service
- assistance during the initial operational period.



3.1.3 ICS required service standards

To access ICS funding, a CSO needs to be able to deliver across a range of quality, technological and organisational standards designed to guarantee a functional system and high customer satisfaction nationally. These criteria are described in detail in Appendix B to this report and include:

- more than 90% satisfaction of vehicle demand for all reservations made 3 hours before the effective pick-up time (calculated monthly)
- vehicle replacement at three years or 100,000km travelled
- maintenance check at least twice a month, cleaning at least once a week
- one newsletter per year sent to all clients, with scope for feedback and complaints to be dealt with in a maximum of three days
- all vehicles must conform to EU fuel consumption, emissions and security standards and those of the well-established Blue Angel eco-label³⁶
- the local car sharing provider must coordinate with other network CSOs by providing access to vehicles without the need for another membership fee, with the same conditions and regulations
- reservations and vehicle access must be possible 24 hours a day, 7 days a week.

3.1.4 Technology

Innovative projects in both Venice and Palermo adopted automated software for fleet management. On a central server, the system stores all the information on the different vehicles of a fleet including booking information, data on usage such as mileage and condition of the vehicles. In Europe, the TOSCA project has supported the take-up of IT-based car sharing (see References).

Self-service points in all car share parking locations communicate with the central server and are able to receive information directly from the vehicle. In-vehicle technology includes a security system, which allows access only to authorised clients and a smart card, which registers all data including usage and fuel consumption. Electric vehicles' batteries can be recharged at parking locations. In Palermo, photovoltaic panels are used for recharging. Electric vehicles make up the entire vehicle fleet in Venice.

3.1.5 Summary of implementation success in Italian car sharing

National funding for CSO start-ups is likely to be finite. Local authorities will take over responsibility, often in the form of promoting the service, administrative support, parking spaces and integration with public transport.



3.2 UK: A PREFERRED CUSTOMER MODEL

The Easycar[®] Club business, started in March 2003, is part of a wider strategy promoted by the EasyGroup[®] Company, which focuses on delivering a low-cost, streamlined service across a number of transport modes. The group includes Easyjet[®] low cost flights and Easycar[®] rental. The pilot car sharing scheme in North London, at the time of writing has 1400 members and five cars. The objective is to establish up to 30 new car club sites in the UK during 2004, each with 50 cars.

3.2.1 Easycar[®] Club characteristics

Unlike other UK car clubs, Easycar[®] Club does not intend to levy a joining fee. Instead, members will be invited to join once they have completed three successful (uneventful) rentals from Easycar[®]. This is the criterion used in the pilot project, but membership criteria might change when the business is expanded.

The Easycar[®] Club is based on the operational aspects of the Easycar[®] rental model, and is almost entirely automated. This cost saving means that Easycar[®] Club vehicles can be rented out very cheaply, as little as A\$1.69 (70p) per hour or even A\$6.03 (£2.50) per day (depending on availability).

The model requires customers to make Internet reservations and to use a mobile phone when they arrive at the vehicle location so that operators at Easycar[®] can unlock the motor vehicle remotely (using mobile technology connected to the central locking system and its immobiliser). The customer is then able to retrieve keys from the glove compartment.

Easycar[®] uses off-the-shelf consumer technology and the relatively low cost of the technology contributes to the low cost of the car share. Although the Easycar[®] Club venture is not motivated by community, ethical or environmental concerns, it does not mean that the business model does not achieve goals in those fields.

3.3 AUSTRIA: COMMERCIAL PARTNERSHIP

AutoTeilen started in Graz with just ten members and one car in January 1993, but always aimed to go nationwide and become a commercial venture.³⁷ Growth was relatively rapid until 1997, when with about 800 members, growth rates declined. This had not been foreseen in the business plan and the CSO almost went bankrupt.

A number of factors put the organisation at risk:

- **Using deposits to buy cars:** member deposits were used to buy new cars to expand the fleet. When members started to leave the organisation, deposits had to be paid back to them, leading to a depletion of cash flow.
- **Expensive administration, use of call centre and management:** these were intended to support the goal of becoming a commercial operation but they did not fit the very small size of the organisation and were too expensive.
- **Not enough capital to commercialise the venture:** with the spread of IT (e.g. mobile telephones, Internet) to a large proportion of the population, a technology update was essential. It was not possible for the small CSO to finance this and no more capital was available.
- **No powerful supportive partners:** without trust in the development of the company it was not possible to raise cash.
- **Business plan not well developed:** contingencies were not included or not adapted in time.

The crisis was resolved by selling the customer base, the expertise and the cars to the company Denzel. Denzel was Austria's second largest motor vehicle importer, a motor vehicle retailer and car rental company. It had almost no car sharing customers, but did have financial power. The transition was followed by a major investment in technology and Denzel provided new vehicles. Marketing, in combination with forging new partnerships, contributed to rapid growth, from about 800 members in 1998 to over 5,000 in 2002 (over 50% per year on average).

³⁶ Developed in Germany in 1978 see <http://home.tiscalinet.ch/hahn/engel>

³⁷ Information from: Peter Novy, *Dokumentation über den Aufbau einer Car sharing-Organisation, Graz 1993*





Merging car rental and car sharing

In 2003, the newly formed Denzeldrive merged its car rental operation with its car sharing operation, creating a fleet of 750 vehicles. Two hundred and fifty cars are stationed in 113 locations across Austria. Some are located in Denzeldrive-centres, which offer information and advice, membership, rental cars and in most locations, motor vehicle sales. The customer gets a card and time budget and can reserve cars without coming to a rental station or completing forms. The car rental section of Denzel now operates essentially in the same way as car sharing, except that the price is based more on the length of time the vehicle is used and less on the kilometres travelled and the minimum duration is different.

One of the key unknowns with this model relates to the management of the inherent risks associated with the potential cannibalisation of the established rental business by the car sharing business. While much of this information appears to be subject to commercial-in-confidence, it appears that Denzel is using the joining fee as a barrier to infrequent renters using the cheaper car share scheme and is using the car share scheme to increase utilisation rates for rental vehicles.

3.3.1 Technology

Denzeldrive invested heavily in technology and marketing. The booking system is now computerised and able to function 24 hours a day, 7 days a week via the Internet and telephone and is run by a professional call centre. Most cars are equipped with an on-board computer enabling unlocking and locking with a smart card and automated monitoring and reporting.

Denzeldrive bought most of its technology off-the-shelf and customised it to local needs. The system has the following components:

- in-vehicle computer with chip card reader, time and kilometre registration, communication unit, fuel tank card
- computer chip cards for clients. These smart cards carry information about the client
- internet platform for information, booking and car monitoring
- central server with communication unit and billing system.

3.3.2 The process

Reservation is either by Internet or telephone. Information is downloaded from the central server to the on-board vehicle computer. A 'smart card' opens the car. The distance driven is registered and relayed to the central server. This process is shown in more detail in Appendix C.

3.3.3 Business car sharing

Denzeldrive offers three special packages to businesses:

- Classic-drive: employees become members of the car share organisation. If there is enough demand, one or more cars can be located near or on the company premises, but must be available for public bookings. Cars can be used for private and company use.
- Special-drive: in addition, some of the car sharing fleet is available for block bookings according to company needs.
- Company-drive: the company gets a fleet of cars for the exclusive use of employees. Rates are negotiated to form a customised package.

All these modes effectively outsource the management of a company car fleet. The reservation system and the monthly bill provide a monitoring and cost allocation tool. In all cases, the outsourcing has led to a decrease in costs for the companies.

Business car sharing provides a mobility package for employees. If a company simultaneously encourages employees to come to work by bicycle or public transport, car sharing effectively provides for instances when employees need a motor vehicle. Employees can also book their car-based mobility in other cities (e.g. for business trips).





Figure 2: Car Sharing Cars Carrying Advertisements

3.3.4 Partnerships

Six major Austrian public transport organisations including the national Austrian Railways, include car sharing in their marketing campaigns and Denzel provides a discount of between 32% and 45% on membership fees for holders of annual tickets. Since 2003, Denzeldrive has provided cars carrying advertisements (See Figure 2), which can be used at half the price of normal cars.

3.3.5 Strong focus on one city

Denzel concentrates its marketing efforts on Vienna, with 51 car sharing locations. Vienna has 1.5 million inhabitants and with over 2 million in the wider metropolitan area, constitutes 25% of the population of Austria, much like Sydney (See Table 1). It is more than six times as big as the next biggest city, Graz (pop. 230,000).

3.3.6 Connection with mobility centres for public transport

Denzeldrive has maintained the partnership established by AutoTeilen with a mobility centre,³⁸ which provides information on public transport timetables and tariffs and sells tickets, for marketing reasons.

3.4 USA: PUBLIC-PRIVATE PARTNERSHIPS

The US experience of car sharing has interesting aspects, including the involvement of government through public-private partnerships, the provision of car sharing to business and the development of partnerships supporting CSOs, including universities and public transport companies.

3.4.1 Local to interstate

Car sharing in Seattle started in January 2000, when 50 residents of the suburb Capitol Hill began the car share organisation Flexcar. It started as a public-private partnership between the company, Mobility Inc., the City of Seattle and King County (Washington State). The City invested A\$46,500, while the County added A\$310,000 in federal grant money specified for programs to support commuting without private motor vehicle use. Flexcar shared office space in a County office building and received marketing support from King County.

In 2001, Flexcar took over Car Sharing Portland (470 members and 25 vehicles), a commercial car share

³⁸ www.mobilzentral.at

operation that had originated in that city and was renowned for its environmentally progressive policies.

In 2002, Honda purchased an 18.4 per cent equity stake in Mobility Inc., the company that runs Flexcar. 110 cars, including 75 Hondas, serve 4000 clients in Portland, Seattle, and Washington D.C. In the following months, Flexcar expanded to Virginia, Maryland and California, including Los Angeles and San Diego, always following the same step of creating partnerships with local public transport providers, universities and businesses.

Vehicles

Depending on the city, the fleet varies slightly in terms of the car types offered. The primary cars in the fleet are Honda Civics and Hybrid Honda Civics, but there are special vehicles, including Ford Ranger Pickup Trucks, AWD Honda Elements, a 7-passenger minivan, an Acura Sedan and a Mazda Miata convertible.

3.4.2 Business car sharing

Flexcar found its clients were not necessarily interested in replacing their cars altogether, but in using car sharing as a supplement to public transport or as a substitute for a second car. The biggest growth came not from individuals, but from small and medium-sized companies that did not want to maintain their own car fleet.

Marketing was tailored to attract more businesses as clients, as well as people looking for second cars. Flexcar has grown to 12,000 members offering services in more than 20 cities in eight States.

Like Denzeldrive, three different business packages are offered. They are shared car use (using all vehicles in the Flexcar fleet with a business membership), semi-exclusive use (where one or more vehicles is located at the business site for exclusive use in office hours and use by any Flexcar member outside those hours) and exclusive use (exclusive use of one or more vehicles at or near the office).

3.4.3 Partnerships

Flexcar has established a wide variety of partnerships. Public sector partners include local governments, universities and public transport companies. Private sector partners include bike stations³⁹ and business car sharing with private companies.

Some of the partnership characteristics include:

- **Cities:** Flexcar and local governments have special deals for people who are willing to join the car sharing organisation. For instance, new members do not have to pay the membership fee and get the first month for free, subsidised by the local government.
- **Universities:** several partnerships with universities were developed, offering special discounts for using the cars, with the universities subsidising half the CSO membership joining fee.
- **Public Transport:** cars were located at or near public transport stops to expand the scope of mobility offered to public transport passengers. Special combined tickets for users of public transport and car sharing were offered. Flexcar launched car sharing in Washington D.C. by establishing a partnership with the Washington Metropolitan Area Transit Authority (Metro). Cars were placed at or near designated Metrorail stations to expand the scope of service offered to Metro's passengers and enhance their options for travel in the region.
- **Bike stations:** The client is able to decide between bikes, scooters and car sharing. As all vehicles are environmentally-friendly electric cars, this partnership was declared a clean mobility centre, with the aim of providing a wide range of zero emission vehicles for short trips.
- **Private Companies (Starbucks Coffee Shops, real estate agencies, PCC Natural Markets⁴⁰):** Flexcar members get special discounts offered exclusively to them by these companies. Member companies offer discounts based on the savings they make by outsourcing their fleet management. Members of private companies pay half the membership fee when they join for their private use.

³⁹ Bike Stations provide secure bike parking for commuters. For further details see article in Transportation Alternatives: <http://www.transalt.org/press> (see TA Magazine Archive, 1999, TA Magazine Oct/Nov 99, Bicycle Innovation Spotlight)

⁴⁰ The largest natural food cooperative in the USA, established in 1953.



Table 1: Key Parameters Car Sharing 1991

(International Sourcebook of Automobile Dependence)

Topics	Cities	Adelaide	Brisbane	Canberra	Melbourne	Perth	Sydney	San Francisco	Zurich
Urban Population		1 M	1.3 M	0.28 M	3 M	1.1 M	3.5 M	724 T	360 T
Urban Density in Inner Areas									
Population/ha		18.7	20.3	8.6	27.2	16.3	39.2	59.8	73.5
Jobs/ha		26.0	20.7	13.4	43.0	15.9	38.1	48.3	72.8
Passenger cars/1,000 people		537	463	457	518	523	449	604	444
Parking Space									
Places/1,000 CBD workers		580	322	807	337	631	222	137	137
PT Service Supply									
Vehicle km pa		47 M	73 M	19 M	151 M	54 M	333 M	182 M	152 M
Vehicle km per person pa		46	55	68	101	47	94	49	148
Speed PT (km/h)		23	39	3	27	26	34	33	45
Speed private transport (km/h)		46	50	50	45	45	37	44	26
Modal split JTW		12	15	10	16	10	25	35	40

Source: Binary Consultants Pty Ltd



The opportunity remains, however, to systematically develop appropriate indicators and an agreed methodology to compare different car sharing schemes.

Some potential indicators include:

- number of vehicles/members (total members)
- reduction in private motor vehicle kilometres travelled (VKT)
- CO₂ emissions reduced
- number of cars replaced
- increase in public transport use
- increased time walking and cycling
- area/kerbside distance of parking saved with opportunity for improved re-use, e.g. as dedicated cycleway, parkland and/or open space
- more affordable housing or other savings in developments, e.g. saving space and costs of parking and improving amenity.⁴²

4.1 Introduction

In this section we consider the range of benefits associated with car sharing. The examples described in Section 3 gave an indication of the range of objectives that CSOs seek to address. In this section we discuss the benefits according to key stakeholder impacts:

- individuals participating in car sharing
- businesses involved in using car sharing
- communities who have access to car sharing
- governments that are involved in car sharing
- public transport providers and other potential partners.

It is generally difficult to compare 'results' from different car sharing organisations in different locations. This is partly because of a lack of an agreed methodology for evaluating car sharing projects⁴¹ and partly because the location of the CSO (and its proximity to public transport) can have a major impact on its long-term sustainability. This is not to say that individual schemes have not been evaluated, as significant amounts of data have been collected.

4.1.1 Benefits to individuals involved in car sharing

The following are some of the key reasons individuals may choose to be involved in a car sharing organisation:

- **Economic:** significant reduction of costs as opposed to owning a motor vehicle,⁴³ including no need for private parking space⁴⁴ and the opportunity to redeploy household expenditure that would typically have been devoted to the sunk costs associated with motor vehicle ownership.
- **Convenience:** no administrative effort or time expenditure on insurance, purchase and sale, repairs, permits etc.
- **Improved access:** enhanced mobility options, including access to multiple types of vehicle resulting in a choice of the most economically sensible transport mode.

⁴¹ Most vehicle-sharing programs do not report the outcomes using the same set of indicators (Sperling, D. Shaheen, S. & Wagner, C. 2000, Car Sharing and Mobility Services – An Updated Overview. Available online: <http://www.calstart.org> (Clean Mobility)

⁴² Linked to 'car-free' housing – see Section 1.3 and NSW Government Sustainable Buildings Program

⁴³ When compared with car ownership, if people drive less than 10,000km per year and drive new cars, in which case, car sharing is usually a more efficient use of assets compared with cars used for only a few hours on some days.

⁴⁴ The provision of prioritised, dedicated spaces for car share vehicles is an added benefit for customers in some locations.





4.1.2 Companies

The involvement of companies in car sharing (as customers not operators) has been a relatively recent change. Along with realising the benefits that accrue to individuals, businesses experience the following benefits:

- **Economic:** a vast reduction in costs can be achieved by outsourcing fleet administration and management. This is also a more efficient use of assets for participating companies.⁴⁵ Companies can also reduce the cost of parking provision.
- **Convenience:** car sharing provides a simple solution for 'guaranteed ride home' schemes included in some workplace agreements.⁴⁶

4.1.3 Communities

Car sharing, as it is increasingly adopted, delivers a range of benefits to communities including:

- **Reduced car use:** reduction in number of cars on the road (on average, car sharers drive 50–70% less than car owners). Because cars are expensive to own but cheap to drive, owners have an incentive to maximise their use. This increases external costs such as traffic congestion, increased demand for expensive road infrastructure, accidents and environmental impacts.
- **Reduced impacts of car use:** proportional reduction in congestion, emissions, noise and accidents that impact on the whole community.
- **Reduced parking costs:** car sharers do not need a parking space at home and in cities this is often a major cost. In most studies, it is stated that one car sharing vehicle replaces between four and ten privately owned cars on the road. These numbers were developed in the pioneering days of car sharing. Indications are that this number is too low and in:

⁴⁵ Subject to how often they need access to a car and how often they drive, i.e. this arrangement is not necessarily more economically efficient for all businesses.

⁴⁶ 'Guaranteed ride home' is usually offered in conjunction with overtime or varied hours and without car sharing can mean the provision of taxi vouchers to employees working late.

- Germany the ratio of members to cars in 2002 was 23:1
- Switzerland the ratio increased from less than 10:1 to 29:1 in 2002
- the USA, the ratio increased from 27:1 to 37:1 (for Flexcar1, it is close to 50:1)
- in the car-free housing project in Vienna, where originally 25 car share vehicles were planned for over 240 households, just three car share vehicles suffice for over 100 households with car sharing membership.
- Increased public transport use: car sharers use variable modes more frequently than car owners and this can increase the need for public transport services. If these are provided, the community (especially non-drivers) receives multiple benefits.
- Increased equity: car sharing can reduce the need for parking as part of residential developments. The reduced costs of providing car-free housing can increase affordable housing.

4.1.4 Government

Governments in some locations have chosen to support car sharing organisations, including at the critical start-up stage. These governments have recognised some of the following benefits:

- **Economic:** opportunity to reduce expenditure in maintenance and expansion of the national road network and new business opportunities creating economic development.
- **Health:** increase in 'active transport' and consequent health benefits and reduced health intervention expenditure mainly through the increased use of public transport by CSO members (and the resulting incidental physical activity) but also potentially through the provision of a range of non-motorised vehicles by car sharing organisations.⁴⁷
- **Planning:** reduced requirement for parking provision in new developments, thereby increasing space for social and community uses.

Car sharing can also help achieve many of government's stated objectives including:

- **Transport:** reduced congestion and increased patronage on public transport.
- **Environmental protection:** reduced air pollution, reduced greenhouse gas emissions and reduced traffic noise.

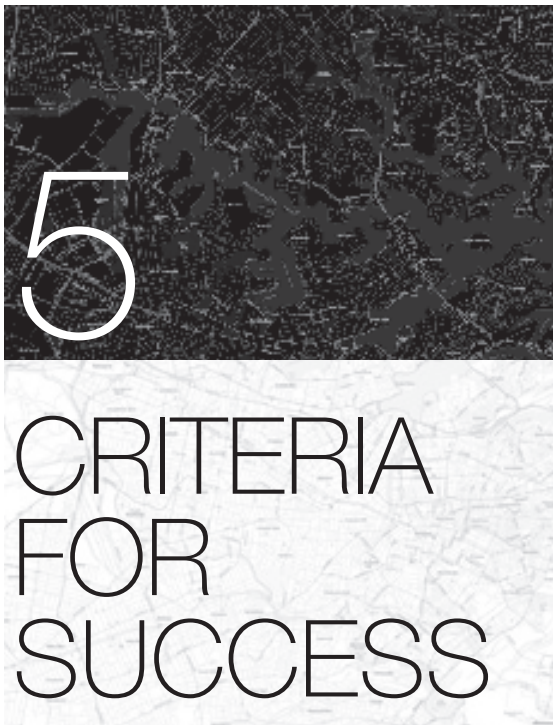
4.1.5 Public transport operators and prospective partners for CSOs

Car sharing organisations are increasingly forming partnerships with other organisations, either to expand mobility services or to strengthen a client base with major trip generators. Benefits accrue to both the CSO and its partners. Benefits for partners vary according to the kind of organisation and their objectives but can include:

- improved profile for the partner organisation in terms of community service contributions
- promotion of the organisation's other services
- increased passengers and resulting increased revenue for public transport operators
- increased efficiency of public transport services if they are operating below capacity
- increased competitiveness of public transport with other modes for longer trips through linking car sharing to the end of long distance public transport trips to avoid the inconvenience of not having a car at the destination.

⁴⁷ Honda has started providing a range of non-motorised vehicles in their partnership with CSOs





5.1 Are conditions in Australia suited to car sharing?

The benefits of car sharing described in Section 4 are likely to be available in Australian settings but no single model is thought to be easily transferable to all settings. The multilayered nature of the concept and its practice requires a flexible and considered approach. There is a great deal of enthusiasm for the concept and the issue of financial risk now needs to be carefully managed. The key learning to draw from international experience is that at the outset, financial, legal and partnership arrangements are crucial. Without the appropriate arrangements, CSOs will not realise their maximum potential economic, social and environmental benefits. This section describes some of the main criteria for successful car sharing organisations.

5.1.1 Factors to consider

Some things in Australia are distinctly different to European locations where CSOs are well established:

- levels of public transport service in Australian cities are much lower than in European cities, (and Zurich, home to one of the biggest CSOs, is one of the best served cities in Europe)
- car reliance is longer than in Europe
- average distances travelled by motor vehicle are much longer in Australia
- bicycle use is much lower in Australia (although in Zürich usage is also low, at 4% of trips)
- car ownership is longer than in European capital cities
- fuel costs are much lower in Australia.

It is important to note, however, that CSOs are operating successfully in North America and in Asia.

5.2 Structuring a CSO

Car sharing organisations need to work with other organisations to effectively establish and manage two of their key infrastructure needs—parking spaces and vehicles. They also need to be able to manage rapid growth rates and have often benefited from partnerships or joint ventures.

5.2.1 Involving government

The role of government generally and local government in particular is important. Significant contributions have been made by government toward embedding car sharing as part of mobility management, including establishing a supportive policy context (See 3.4.3). Contributions have also come in the form of direct start-up funding, coordination at a national level, localised land use or parking policies or in-kind in the form of space for parking car share vehicles (See Section 3.1.1 for example).

National approaches to car sharing, such as Italy's ICS (See Section 3.1.2) have particularly focussed on establishing minimum service standards and ensuring compatibility between CSOs with different objectives in different locations. Local government planning requirements are also important as they impact on parking provision, both requirements for car parking as part of a residential development and the control of local street parking (See Section 1.2.1).

5.2.2 Involving vehicle manufacturers

Vehicles are the other vital infrastructure for a CSO. Vehicle manufacturers and CSOs both benefit from the involvement of a vehicle focussed organisation with expertise in fleet management. This fleet expertise reduces risk for the CSO. The promotional benefit for vehicle manufacturers is the key reason they have generally provided commercially competitive rates to CSOs (See Section 1.2.2).

5.2.3 Managing rapid growth

Most successful car sharing organisations have grown from very small initial efforts. Slow early growth is often followed by rapid growth. After an establishment phase, successful car sharing organisations tend to grow rapidly. Growth rates of over 50% per year are normal. This puts a heavy strain on management as workload increases rapidly, new personnel have to be recruited and trained and work profiles change. Organisational change needs to be managed carefully and growth is not necessarily reliable. At certain thresholds, there have been dramatic declines in growth, so management has to be flexible enough to handle the dynamics of the business (See Section 3.3).

5.2.4 Participants

Successful CSOs commonly form partnerships or even joint ventures. Partnerships serve a number of functions and, in addition to local government and vehicle manufacturers the following kinds of partners are common:

- public transport providers, which can assist in developing and marketing a 'total mobility package' through railway stations, public transport interchanges, websites, leaflets and posters
- urban developers, who can design and construct car-free or reduced car parking housing sites
- major trip generators such as universities, TAFE colleges and hospitals, which can be clients of CSOs themselves or provide information to students and shift workers as potential clients
- hotels, which can offer car sharing mobility to employees and guests in a similar manner to tourist hotels offering the use of bicycles (e.g. as happens in Cairns and Perth).

Partners might have different overarching goals but car sharing can assist them to achieve those goals.

5.3 Type of CSO

Car sharing is not a one-size-fits-all mobility solution. Objectives vary, a range of participants can be involved, it can fit into different places and the infrastructure and products used by a CSO are adaptable. This report identifies that CSOs have often developed for or been supported by specific housing developments and/or with public transport operators (See Section 1.3). These two approaches incorporate the following illustrative range of objectives for CSOs:

- reducing private car use (and ownership)
- reducing emissions (including greenhouse gas) from car-based transport
- addressing parking constraints, particularly for residential developments
- increasing public transport patronage
- making a commercial profit or offering a 'social profit' service to people.

5.4 Location and Clients

Compact urban spaces which have been designed to maximise access by walking, cycling and public transport tend to be more conducive to car sharing because car sharing relies on members being able to meet most of their access needs by other modes and using car sharing to 'fill the gap'. Population density and other demographic characteristics are examples of aspects to consider in establishing a CSO, since the people in the catchment area and their travel patterns (including typical car usage) will be a controlling factor in the number and type of vehicles needed in the fleet. To provide good interoperability between public transport and car sharing vehicles, it is essential to locate vehicles in convenient places.

Whilst individuals were the original clients of CSOs, almost all car sharing organisations have now established specific marketing within the corporate sector, usually called business car sharing. Special packages are developed for company employees and the system can offer a combination of business trips and private use mobility. Business car sharing is effectively outsourcing the management of a company's motor vehicle fleet, removing costs such as purchasing, re-sale, maintenance, reservation, insurance and excess capacity. Types of business car sharing are described in more depth in the Austrian and US examples (See Section 3).



5.5 CSO infrastructure

This section summarises some of the more detailed considerations for CSOs when planning their operations in terms of the service they need to offer clients, with technologies, the vehicle fleet and mobility packages as selling points. For car sharing to be a viable alternative to private cars, the standard service is usually available 24 hours a day, 7 days a week with a probability of obtaining a vehicle at the desired time of approximately 95%.

Although many car sharing organisations still manage their services and operations manually, all the bigger and most of the new car sharing organisations use computer-based technologies. For example Mobility[®] is fitting vehicles with GPS devices and capacity for automatic registration of journey data and remote transmission of information and bookings via the Internet to the coordination centre.

Car sharing organisations use their vehicle fleets and public transport packages as incentives for new clients to join the service. Car sharing vehicle fleets tend to be comprised of small economy cars including hybrids and station wagons, but CSOs often offer a small number of more expensive alternatives: convertibles, minivans, vans, four-wheel drive vehicles, trucks and small buses. Some CSOs also offer bicycles (e.g. tricycles, electric assisted bicycles) and hybrid or alternatively fuelled vehicles as an opportunity to demonstrate new energy efficient vehicles and to increase their visibility (See Section 1.1.3). The ratio between membership and numbers of cars varies between 10 and 30 members per motor vehicle. The bigger the membership, the more flexible the system gets, as there can be more cars per location. With this type of economy of scale, Mobility[®] Car Sharing in Switzerland can today afford to have a ratio of 29 members per car, after starting with a ratio of ten per car (See Section 4.1.3 for other examples).

An increasing trend among CSOs operating in partnership with public transport providers is offers of discounts on one or both services when 'mobility packages' are purchased. Examples include Mobility[®] in Switzerland (See Section 2.1.2) and Bremen in Germany (see Section 1.3).

5.6 Further research

Car sharing is an increasingly well-documented research area and readers considering supporting or establishing CSOs may also like to refer to the European Conference on Mobility Management (ECOMM)⁴⁸ and research underway at the Californian Institute for Transport Studies. The key research of relevance included in the May 2004 ECOMM conference program is from the Institute for Applied Ecology in Germany (the Öko-Institut). Researchers from this Institute are working for the German Federal Ministry of Transport and developing recommendations for both government and potential CSO operators to improve car sharing.⁴⁹

The North American experience may also be particularly useful in the Australian context. Having already completed a pilot car sharing project⁵⁰ (CarLink II), a research team at the Institute for Transport Studies (ITS) at the University of California (Davis)⁵¹ now focuses on Innovative Mobility Research (IMR). At the time of writing, ITS was researching car sharing using predictive modelling to understand the benefits available from combined car sharing and car reduced living.

As a relatively new concept in Australia, car sharing could be introduced by demonstration or pilot projects, as has been done in other countries. The Australian context and existing car use patterns present a further dimension for car sharing research. Whilst this report indicates that government, particularly local government, can play a vital role in supporting CSOs the report also gives rise to a number of questions warranting further research.

⁴⁸ ECOMM 2004 took place May 5–7 and the program is available online at http://www.ontario-conference.com/ecomm/GB/menu_flash

⁴⁹ http://www.oeko.de/transportation_engl

⁵⁰ Susan Shaheen, Honda Distinguished Scholar in Transportation Policy and Behavioural Research, managed the project and the resulting publications can be accessed at <http://www.gocarlink.com/>. Dr Shaheen directs ITS Innovative Mobility Research.

⁵¹ <http://www.its.ucdavis.edu/>, Prof. Daniel Sperling (Director).



There is a lot of information available, particularly on the Internet, but most acts as an interface between CSOs and their clients. Major sources for prospective CSOs are: MOSES, TOSCA, the World Carshare Consortium, ITS at University of California (Davis) and UITP.

MOSES (Mobility Services for Urban Sustainability) (www.moses-europe.org)

MOSES is a project co-funded by the European Commission's, key action area, 'City of Tomorrow'. It began in June 2001 and the overall objective is to increase the efficiency and attractiveness of cities. Its two aims are to develop innovative mobility services based on car sharing and to integrate those services with urban development and other forms of sustainable transport. MOSES operates in Stockholm, London (Boroughs of Southwark and Sutton, UK), Wallonie (Louvain-la-Neuve, Dinant, Namur, Belgium), Prague (study only), Genoa, Palermo and Torino in Italy. A workshop was held in December 2002 called *Public Transport and Car sharing: Together for the Better*. A key reference is the Final Report (2004), *Car sharing – A Guide for Actors, Bremen*.

TOSCA official reports

(<http://www.atc.bo.it/progetti/tosca>)

The TOSCA project supports the take-up of IT-based car sharing throughout Europe. The project partners developed and implemented a pilot car sharing service in Bologna, based on the experience of Bremen. This project, funded by the European Commission's IST program, also promotes best practice for car sharing in Europe. TOSCA project partners include: ATC Bologna, Freie Hansestadt Bremen, INVERS GmbH, Rupprecht Consult GmbH, Polis, Access, TMB Barcelona, Auto'trement Strasbourg, and RATB Bucharest. Final results available from the project include a Take-up Guide, the Final Report and an Evaluation Report.

World Carshare Consortium

(<http://ecoplan.org/carshare>)

The World Carshare Consortium describes their organisation as a "free, cooperative, independent, international communications program" supporting carsharing projects and programs worldwide. The site includes a world inventory of CSOs and frequently updated media resources about car sharing. Eric Britton is a key contact and a key reference is *The Journal of World Transport Policy and Practice*.

Institute for Transport Studies (ITS), University of California (Davis) (<http://www.its.ucdavis.edu/>)

ITS research on car sharing includes a pilot project (CarLink II), modelling of benefits and studies looking at implementation and establishment issues in other locations. Selected publications include:

Shaheen S, Sperling D and Wagner C. 'Car sharing and partnership management: an international perspective', *Transportation Research Record*, Iss.1666, (1999) pp. 118–124.

Shaheen, S. Meyne M.A, and Wipyewski K. *U.S. shared-used vehicle survey findings: opportunities and obstacles for car sharing & station car growth*, 01/2003.

Sperling D and Shaheen S. *Car sharing: niche market or new pathway? Institute for transportation studies*, 12/1999.



International Association of Public Transport (UITP) (<http://www.uitp.com>)

Selected publications include:

Glötz-Richter M. "Bremer Karte plus AutoCard" Experiences from Bremen, PTI 06/2002.

Holm B and Müller-Eberstein F. Car sharing and Public Transport: the Dresden model, PTI 06/2002.

Jussiant L. Combined mobility and car sharing, PTI 06/2002.

Mathieu Y and Jussiant L. Car sharing: a mere concept or a future reality? PTI 06/2002.

Traue R and Lieberum A. 'VIVALDI': calling the sustainable mobility tune, PTI 06/2002.

UITP Bremen Paper – Public Transport and Car sharing: together for the better, Dec. 2002.

OTHER INTERNATIONAL RESEARCH

Ball C. (2002) *Realising the potential for car clubs*, Smart Move Ltd. 11/2002.

Harms S and Truffer B. The emergence of nationwide car sharing cooperatives in Switzerland <http://www.jrc.es>

Herry/Rosinak: Die Akzeptanz von Car sharing in der näheren Wohnumgebung (Study on the acceptance of car sharing in Austria (Vienna 2000))

Iacovini C, Sardi, L and Villani P. Servizio di car sharing nell'area turistica progetto tecnico-economico di fattibilità (Car sharing service in a tourist area: technical and economic project), Provincia di Rimini 02/2002.

Journal of World Transport Policy and Practice, Vol. 5 No. 3 Special Issue Car Sharing. A Hammer for Sustainable Transport. Available at <http://www.eco-logica.co.uk> (see world Transport Policy and Practice)

Meaton, J. Starkey R & Williams, 'S: Stelios – the accidental environmentalist? The potential impacts of the EasyCar Club in the UK' *World Transport Policy & Practice*, Volume 9, Number 1, (2003) 31–36. Available at: <http://www.eco-logica.co.uk> (see World Transport Policy and Practice)

Scott S. CHOICES in clean, affordable transportation, evaluation of the CHOICES vehicles scrap program, 06/2001.

Scott, S. Business planning study: car sharing in Portland, Oregon, 07/1997.

Taylor, J. 'The Heineken effect: car clubs and sustainable housing', <http://www.carclubs.org.uk> (see Car Clubs then City centre living/Low car housing)

TCRP Transit Cooperative Research Program (Final Report by 2004): *Car sharing – Where and How it succeeds*, Washington DC USA

White K. Americans sharing cars? City carshare: a model for national replication, 11/2002.

Yorkshire and Humber Assembly. Achieving low car housing: the role of car share clubs: a good practice guide for planners and developers, 01/2002.



6.1 WEB LINKS

6.1.1 Car Sharing in Europe

European Car Sharing:

<http://www.carsharing.org>

Car Sharing in Austria:

<http://www.denzeldrive.at>

Car Sharing in Belgium:

<http://www.ieb.be/carsharing/carsharing.htm>

<http://www.cambio.be>

Car Sharing in Denmark:

<http://www.carsharing.dk>

<http://www.andelsbil.dk>

Car Sharing in Finland:

<http://www.citycarclub.net>

Car Sharing in France:

<http://www.autotrement.com>

<http://www.caisse-commune.com/>

<http://www.predit.prd.fr/02-Predit/01/publication/fiches/pub0065/synth1.pdf>

<http://www-rocq.inria.fr/imara/opening/Ponthieu.ppt>

Paris: RATP: collaboration Avis Rent-A-Car

Car Sharing in Germany:

<http://www.carsharing.de>

<http://www.stattauto.de>

<http://www.blauer-engel.de> (the official eco-label)

<http://www.cambiocar.com>

<http://www.dbrent.de>

<http://www.choice.de>

Car Sharing in Italy:

<http://www.iniziativacarsharing.it>

<http://www.milanocarsharing.it>

Car Sharing in the Netherlands:

<http://www.autodate.nl>

<http://www.greenwheels.nl>

Car Sharing in Norway:

<http://www.bilkollektivet.no>

<http://www.dele.no>

Car Sharing in Sweden:

<http://www.majornas-bilkoop.se>

<http://www.bildelning.nu>

Car Sharing in Switzerland:

<http://www.mobility.ch>

<http://www.raillink.ch>

http://www.snf.ch/de/com/prr/prr_arh_99may04.asp
(Integrated Mobility Packages)

http://www.vel2.ch/06_progetti/02_easy/index.cfm
(EasyMove, Ticino)

Car Sharing in the UK:

<http://www.carclubs.org.uk>

<http://www.urbigo.com>

<http://www.edinburghcarclub.co.uk>

<http://www.liftshare.com> (see Car Sharing)

<http://www.londoncarshare.co.uk/>

<http://www.easycar.com>

6.1.2 Car Sharing worldwide

The World CarShare Consortium at http://www.ecoplan.org/carshare/cs_index.htm

Car Sharing in Canada:

<http://www.autoshare.com>

<http://www.cooperativeauto.net/>

<http://www.carsharing.net>

<http://www.victoriacarshare.ca/>

<http://www.communauto.com>

<http://www.vrtucar.com/>

Car Sharing in the USA:

<http://www.citycarshare.org>

<http://www.flexcar.com>

<http://www.stncar.com>

<http://www.zipcar.com>

<http://www.citycarshare.org>

<http://www.emotionmobility.com>

<http://www.autoshare.com>

(US CarSharing site, useful links to other CarSharing organisations in the US and Canada)



Car Sharing in Singapore:

<http://www.carcoop.com.sg>

<http://www.whizzcar.com>

<http://www.carcoop.com.sg/>

<http://www.hondadiracc.com.sg/>

EU Projects

<http://www.moses-europe.org>

<http://www.zeus-europe.org>

<http://www.atc.bo.it/progetti/tosca>

<http://www.polis-online.org> (see Innovation, Projects and Results, Tosca)

<http://www.cybercars.org>

<http://www.carsharing.org>

(European network of Car Sharing organisations)

http://www.ecoplan.org/carshare/cs_index.htm



7.1 Appendix A – Glossary of Abbreviations and Key Terms

CSO	Car Sharing Organisation
ECOMM	European Conference on Mobility Management
ECS	European Car Sharing
EPOMM	European Platform on Mobility Management
ICS	Iniziativa Car Sharing association
MM	mobility management
MOSES	Mobility Services for Urban Sustainability
MSM	mode share management

7.2 Appendix B – ICS (Italy) Criteria for CSO Funding

Service Levels

- The level of satisfaction of vehicle demand must be over 90% for all those reservations, which occur 3 hours before the effective pick-up time, this percentage must be calculated on a monthly basis. It has been estimated that in order to guarantee this standard and be profitable there must be at least 10 clients per vehicle.
- Membership of the organisation is open to all people who have the minimum requisites of a driving license and capacity to pay.
- Tariffs must be all-inclusive: petrol, maintenance, insurance, taxes, etc. In exceptional cases extra costs must be billed separately (e.g. trailers, transport of goods, etc.)
- Tariffs must be calculated proportionally between the time used and the kilometres travelled. In any case, tariffs must not include the possibility of free-mileage and should not encourage the use of the vehicles unnecessarily.
- All vehicles must be substituted either every 3 years or when 100,000km reached.
- Vehicle functioning must be checked at least twice a month. External appearance and the internal cleanliness must be checked at least once a week.
- At least one newsletter per year must be sent to all clients, their suggestions must be elicited regularly and their complaints must be dealt with in a maximum of 3 days.
- In case of an accident, the money owed by the client to the car sharing organisation is limited to a predetermined amount (limited liability), and the insurance covering must be comprehensive.
- All client information held by the CSO must conform to national privacy legislation.

Technologies

- In summary, the technological aspects are:
All vehicles must respect the standards indicated by the EU and the Blue Angel Certification, with regards to consumption, emissions and security. Specifically, they must respect, 98/96 (CO₂ < 1 g/km; HC < 0.1 g/km; NO_x < 0.08 g/km) and 93/116 (CO₂ average <165 g/km), along with a noisiness less than 71dB and be adequate to the new European norms which will be indicated by the Commission
- All vehicles must respect the safety norms indicated by current legislation. In particular, car share vehicles must either have at least three stars, if they have had active and passive safety tests

suggested by the European program EURONCAP, or equivalent characteristics. The vehicles must be checked annually according to the norms which regulate vehicles which operate publicly, such as taxis

- All kinds of accessories must be available for free although their use must be regulated (e.g. baby car-seats, chains for snow, etc.)
- The local car sharing organisation must coordinate with other car sharing organisations that are part of the ICS national network, to guarantee the interoperability of the system: access to the vehicles without the need of another membership fee, same conditions and regulations, availability of accessories, same technology for the access to the vehicles (maybe through temporary smart cards and PINs).

Organisational structure

- The reservation system must operate 24 hours a day, 7 days a week and customers must be able to access the vehicle at any time of the day or night.
- Clients must inform within 24 hours of advance the cancellation of a reserved vehicle.
- Customers may book the vehicle until the very last moment they need it, in this case the satisfaction of the demand does not need to be 90%.
- The car sharing organisation must be contactable at least during business hours, the call centre must be operative at least 18 hours per day, from 6 a.m. to 12 midnight.
- The vehicles must be parked close to residential areas or in strategic parking lots. The parking areas must be easily reachable by public transport in order to encourage the integration between different modes of transport.
- The minimum usage time of the service is 1 hour, if the client returns the vehicle before this time the billing will calculate the full hour in any case. There is no minimum distance to be travelled.
- Organisations and companies may become members of the car sharing organisation and employees, associates or others linked to the member may use the service with no need for further fees. Private clients fee indicate their intention to use the service recurrently and not occasionally by paying an annual membership.



7.3 Appendix C – DENZELDRIVE



Collecting the vehicle

The DENZELDRIVE Card is swiped across the Check-Point on the windscreen; the car automatically opens (centralised door locking).



Finishing the trip

The key is re-deposited in the glove box



The keys are in the glove box

Keys, car papers and, where necessary, the garage card can be retrieved from the glove box



Parking and leaving the vehicle

During the reserved time the car can be locked either with the keys or by swiping the DENZELDRIVE Card



Renotification

On continuation of the trip, it is necessary to renotify the on-board computer with the DENZELDRIVE Card. This is necessary to prevent unauthorised use by somebody who stole the keys



On-board computer information

The on-board computer confirms notification, shows driven kilometres and reservation time.



Tanking card

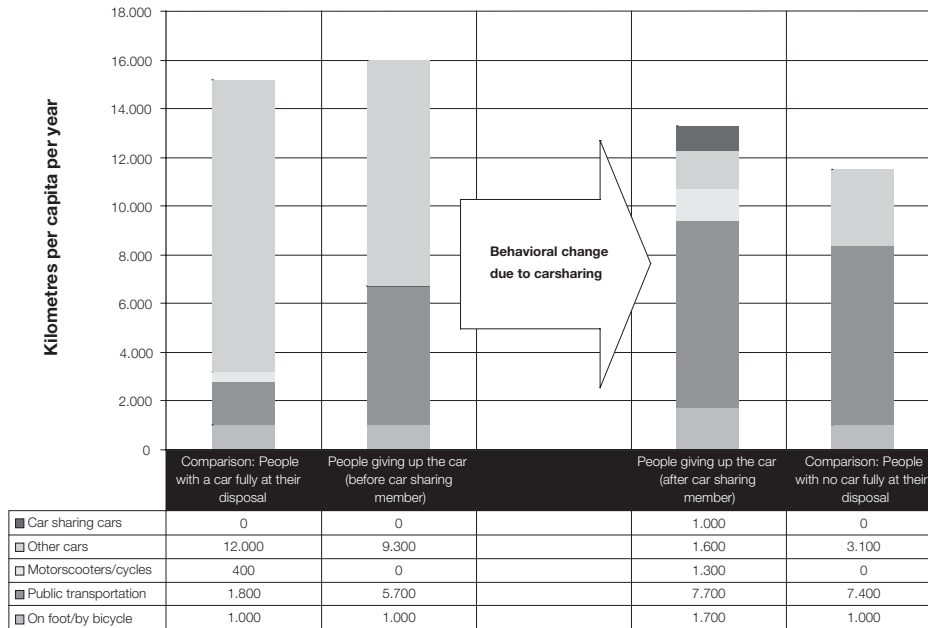
On retrieval of the tanking card the on-board computer shows the PIN-code for using the card needed to pay for petrol with the card.



Locking the car

The car is notified and locked by swiping the DENZELDRIVE Card. The information on the trip is relayed to the central server.

Figure 3: Change in Behaviour



Note: the shift is shown in the second and third column. The first and fourth columns are there for comparative reasons, showing the typical behaviour of these groups in Switzerland.

7.4 Appendix D – Evaluation Results

Whilst the methodologies vary, some evaluations have been conducted and data has been collected which provides insight into the success of some CSOs.

Travel Behaviour Change – Mobility®, Switzerland

Travel behaviour changes related to car sharing have been demonstrated among all the existing projects, although results vary. It is likely that this is owing to most studies having been conducted during the initial phases, when a dense network and full service was not yet available. However, a Swiss study⁵² was conducted when Mobility® Car Sharing already had 20,000 members and almost 1,000 cars.

The study surveyed the behavioural change of people who converted their car ownership to car sharing. In Figure 3: Change in Behaviour, the change in behaviour of this group is compared to the typical mobility behaviour both of people who maintained ownership of a car and of people who essentially live without a car.

Car sharing organisation members:

- on average reduced car travel by around 6,700 kilometres (approx. 72%) per annum.
- travelled more by motorbike (+ 1,300 kilometres p.a.) and travelled less by car share vehicle (only 1,000 km p.a.)
- increased trips on foot and by bicycle (+ 700 km, i.e. +70% p.a.) and public transport (+ 2,000 km, i.e. +35% p.a.).

Figure 3 provides a number of key insights:

- After joining a car sharing scheme, the mobility behaviour of former car owners radically changes. It becomes much more similar to people who do not have a car (shown on the far right column). Before, it was similar to that of average car owners (shown on the far left column). This indicates that the typical car share customer already has a mobility pattern that is different from the average car driver (a much higher level of public transport use), but still drives a car a lot (on average 9,300km p.a.).
- People who join a car sharing organisation but do not have a car do not change their mobility behaviour significantly; they change their already low car mobility partly to car sharing.

⁵² Peter Muheim & Partner: Synthese zu: Car sharing - der Schlüssel zur kombinierten Mobilität, Bern, September 1998 – see also <http://www1.mobility.ch/de/index.htm>

- People who keep their own car, whilst also joining a car sharing organisation, slightly increased their car mobility; they use car sharing instead of buying a second car.

The behaviour change depends on both efficient public transport (frequency, accessibility, network) and an easily accessible car sharing scheme.

Travel Behaviour Change – Other locations

- The car sharing organisation StattAuto München (Germany), reported a dramatic reduction (78%) in the number of vehicle kilometres members drove compared with before they became members.⁵³
- A study of three car sharing organisations in Lund in Sweden published in 2002, likewise showed a reduction of this kind although a more modest one of 30%.⁵⁴
- In Canada, 45% of new members sell their car when joining the Toronto car sharing organisation AutoShare, or join instead of buying a new car.⁵⁵
- Several studies among early adopters in Switzerland in 1990 and 1994, reported that the great majority (over 80%) of car owners joining a car sharing organisation sold their private car.⁵⁶

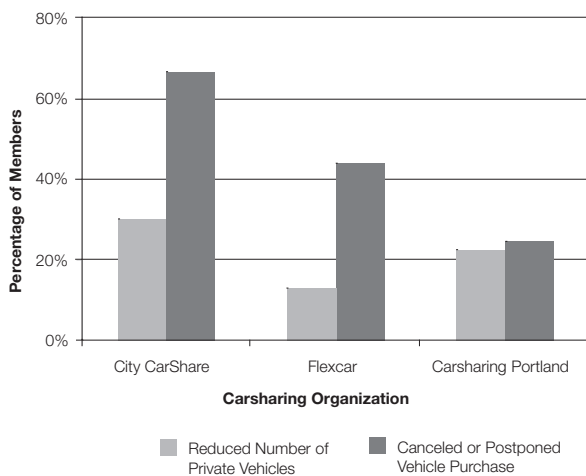
- Denzeldrive, Austria reports that their average car sharing customer drives about 1,400 km per year, compared to an Austrian car owner average of 12,000 km.

- A survey among early adopters in San Francisco found that 52% gave up their vehicle after joining the local car sharing organisation City CarShare and 12% gave up a second car.⁵⁷

- In Switzerland, people who gave up their car as a result of joining a car sharing organisation, reduced their car travel by around 6,700 kms (72%) per annum, increased motor-bike travel by 1,300km pa, bicycle travel by 800km pa and by public transport by 2,000 km pa. In all, the average distance travelled decreased by 2,700 km pa, or 40% of 6,700.

- Figure 4 shows results cited in an as yet unpublished US study.⁵⁸ The study states that almost all surveys of car sharing in the USA deliver unreliable data, as the samples are very small and they often contain a large number of early adopters. However, it is indicative that in the USA a high percentage of people change their mobility behaviour due to the existence of car sharing.

Figure 4: US Behaviour Change Results (unpublished⁵⁹)



⁵³ UITP Bremen Paper, December, 2002.

⁵⁴ Car-sharing in Sweden, July 2003, Swedish National Road Administration.

⁵⁵ <http://www.autoshare.com>

⁵⁶ In Muheim and Partner, 1996 (4), which cites: C. Wagner, ATG-UMFRAGE 1990. ATG, Stans. German, 1990; U. Hauke, 1993 Car sharing-Eine Empirische Zielgruppenanalyse unter Einbeziehung Sozialpsychologischer Aspekte zur Ableitung einer Marketing-Konzeption. Hauke, Feldstrasse, Baum and Pesch, 1994.

⁵⁷ Nelson/Nygaard Consulting Associates, City Carshare vehicle ownership survey results and analysis, San Francisco 2002

⁵⁸ Susan A. Shaheen, Andrew Schwartz, and Kamill Wiprywski, U.S. car sharing and station car policy considerations: monitoring growth, trends and overall impacts, Berkeley, to be published end 2003.

⁵⁹ *ibid*